Claims

[c1]   What is claimed is:

1. A method for analyzing in-line quality control (QC)test parameters, the method being used to analyze a plurality of lots of products, each lot of products comprising a lot number, the products being formed using a plurality of equipments, at least one wafer of each lot of products being tested by at least one in-line QC test item to generate an in-line QC test parameter, the in-line QC test item, and its sample test item and wafer test item being stored in a database, the database further storing the in-line QC test parameter and data of a plurality of lots of high-yield product stocks, such as test items and test parameters, the method comprising:

analyzing the in-line QC test parameter to determine whether the in-line QC test parameter corresponds to a predetermined spec or not;

searching the database to find out the sample test item or the wafer test item related to the in-line QC test item when the in-line QC test parameter does not correspond to the predetermined spec;

searching the database to find out the corresponding test parameters of the high-yield product stocks accord-

ing to the in-line QC test item and the searched sample test item or the wafer test item; and

generating a correlation to illustrate the relationship between the in-line QC test item and the sample test item, or the relationship between the in-line QC test item and the wafer test item according to the searched high-yield product stocks.

[c2]   2. The method of claim 1 wherein the lots of products are not tested by a sample test process and a wafer test process.

[c3]   3. The method of claim 1 wherein the correlation between the in-line QC test item and the sample test item, and the correlation between the in-line QC test item and the wafer test item are generated using linear regression methods.

[c4]   4. The method of claim 1 further comprising:

predicting the sample test result of the lots of products according to the in-line QC test parameter not corresponding to the predetermined spec, and according to the correlation between the in-line QC test item and the sample test item.

[c5]   5. The method of claim 1 further comprising:

predicting the wafer test result of the lots of products

according to the in-line QC test parameter not corresponding to the predetermined spec, and according to the correlation between the in-line QC test item and the wafer test item.

[c6] 6. The method of claim 1 wherein the database stores data of a process step related to the in-line QC test item, and the method further comprises:

classifying the lots of products into two groups according to a first spec, the two groups of products comprising a qualified group of products corresponding to the first spec, and a failed group of products not corresponding to the first spec;

searching the database to find out the process step related to the in-line QC test item;

finding the equipments used in the process step according to the lot numbers of the two groups of products; and

determining the equipment through which a probability that the failed group of products have passed is higher than a probability that the qualified group of products have passed.

[c7] 7. The method of claim 6 wherein commonality analysis is used to determine the equipment through which a probability that a low-yield group of products have passed is higher than a probability that a high-yield

group of products have passed.

[c8] 8. The method of claim 1 further comprising:

searching test results of each of the sample test items and each of the in-line QC test items of the lots of products after a sample test process of the lots of products; and

generating a correlation between each of the sample test items and each of the in-line QC test items according to the searching results.

[c9] 9. The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a multiple regression model.

[c10] 10. The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a stepwise regression model.

[c11] 11. The method of claim 8 wherein the correlation between each of the sample test items and each of the in-line QC test items is illustrated by a residual plot.

[c12] 12. The method of claim 1 further comprising:

searching test results of each of the sample test items and each of the in-line QC test items of the lots of prod-

ucts after a sample test process of the lots of products;

classifying the lots of products into a plurality of groups according to the parameters of each of the in-line QC test items of the lots of products;

analyzing the sample test parameters of each group of products; and

analyzing and obtaining the group of products having the sample test parameters most similar to a second spec when the sample test parameters of the groups of products are different.

[c13]   13. The method of claim 12 wherein an ANOVA method is used to analyze whether the sample test parameters of the groups of products are different or not.

[c14]   14. The method of claim 12 wherein a Duncans multiple range test is used to analyze and obtain the group of products having the sample test parameters most similar to the predetermined spec.

[c15]   15. The method of claim 12 wherein the classified lots of products are illustrated by a box plot.

[c16]   16. The method of claim 12 wherein each of the in-line QC test parameters of the obtained group of products is used as a predetermined spec of the subsequent products.